THE CARBON PROBLEM

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The sheer quantity of carbon in the form of coal and oil, in the earth's crust, seems to offer problems for any young-earth view of origins. Here possible solutions are considered, in particular, the possibility of an at least partly abiogenic origin, and the possibility that the deposition continued for some time after the year of the Flood. There is also the question of carbon in the form of carbonates, which needs some consideration.

For the most part both the actualist[1] and the creationist views hold that all oil and coal are the chemical remains of dead plants and animals. Whitcomb and Morris reject the inorganic view of the origin of oil by stating,

> Another extremely important fact is that apparently all petroleum is organic in origin. There have been inorganic theories of origin in the past, but the accumulated evidence now is overwhelming that petroleum has an organic basis.[2]

Because of this rejection of the inorganic origin of oil they are forced then to view oil as the decay product of plants and animals buried during the flood. They state,

> The exact nature of the organic material has been as yet quite unsettled, but there seems little doubt that the vast reservoirs of organic remains, both plant and animal, in the sedimentary rocks constitute a more than adequate source.[3]

and speaking of the organic origin of coal,

> . . . it is obvious that his conclusion as to the manner of coal formation fits in perfectly with the Biblical Deluge.[4]

One can, however, find difficulty for such a view after an examination of the distribution of carbon in the crust[5] shown in Table 1. This table illustrates the problem presented to the position cited above. The quantity of carbon contained in oil is 666 times greater than the carbon found in all the plants and animals on the face of the earth today. Coal is estimated to contain 50 times more organic carbon than is currently in the entire biosphere.

If oil and coal represent the remains of plants and animals killed in a one-year Flood, then the preflood earth must have been 716 times more lush than at present. Is this reasonable?

It seems not. Assuming that the entire preflood earth had been covered with a tropical rain forest, (and it is difficult to envision the earth any more lush than that) then there is still seven times more coal than could conceivably have come from plant life on the earth's surface (see Appendix). If all the organic carbon in a world-wide tropical forest were converted into oil, it still represents only 1/138 of the total needed to produce all the oil in the world.

The above analysis does not include the large quantity of organic carbon found in the fossil record in the form of carbonate shells. Clark and Stearn describe the Mission Canyon formation and the Livingstone formation of Canada.

> Much of the massive limestone formation is composed of sand-sized particles of calcium carbonate, fragments of crinoid plates, and shells broken by the waves . . . Even in Mississippian rocks, where whole crinoids are rare fossils, and as a result it is easy to underestimate the population of these animals during the Paleozoic era, crinoidal limestones, such as the Mission Canyon-Livingstone unit, provide an estimate, even though it be of necessity a rough one, of their abundance in the clear shallow seas they loved. In the Canadian Rockies the Livingstone limestone was deposited to a thickness of 2000 feet on the margin of Cordilleran geosyncline, but it thins rapidly eastward to a thickness of about 1000 feet in the Front Ranges and to about 500 feet in the Williston Basin. *Even though its crinoidal content decreases eastward, it may be calculated to represent at least 10,000 cubic miles of broken crinoid plates.* How many millions, billions, trillions of crinoids would be required to provide such a deposit? The number staggers the imagination.[6]

Thus the problem for the creationist lies in the view that the Genesis Flood accomplished all of its geological work in one year and thus only one preflood biosphere could have been buried. The three major aspects of the carbon problem—the origin of oil, the origin of coal, and the remains of life left in the form of shells, will be examined in this paper.

Origin of Oil

Two schools of thought have dominated speculation concerning the origin of petroleum and natural gas—those who believe oil is derived from the decay of organic material and those who believe it to be the result of inorganic chemical processes. As noted above, the majority of those who have studied the issues have come down on the organic side of this issue. However, due to the brevity of the creationist time scale, a creationist may find the inorganic origin of petroleum worth looking into. We will look at the strengths and weaknesses of both views in order to determine whether the inorganic view is a tenable position.

The actualist organic view of the origin of oil states that dilute concentrations of organic matter gradually

Table 1. Distribution of Carbon in the Earth's Crust ($\times 10^{18}$ grams)

Petroleum	201
Coal	15
Limestone	64200
Present Biosphere	0.3
Preflood Biosphere*	1.45†

*(Assuming land-mass the same as at present.)
†See the Appendix.

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accumulated over millions of years. As the organic material was buried deeper, the temperature rose, slowly "cooking" the organic material and converting it into natural gas and petroleum. With slight burial more gas than oil is produced. As depth of burial approaches 8-13000 feet, the temperature is such that more oil is produced than natural gas. After strata have been buried below 15,000 feet, the organic material and the oil below that depth is converted to natural gas.

After the conversion process has taken place, the oil must migrate or travel to a place in the subsurface suitable to trap the oil. These localities are called reservoirs, and it is for these that the oil companies search. Thus the oil and gas are not believed to have formed at the same locality at which it is pumped out of the earth. On this aspect, nearly all would agree.

The creationist organic viewpoint will follow similar reasoning. The major differences are the source of the buried organic material and the time believed necessary to convert the organic material to hydrocarbons. The writers cited at the beginning of this article held that the organic material came from the preflood biosphere.

The inorganic position views petroleum as the result of polymerization of the methane (CH_4) which is believed to be an out-gassing product from the earth's mantle. In this view the methane escapes to the surface along deep seated faults and then migrates through the sedimentary rocks to the reservoirs. Along the way the methane and other hydrocarbons are joined to form the longer carbon chains making up petroleum.

Arguments for an organic origin include the following. First, just as the amino acids, proteins, etc., in living things are all optically active, of the left-handed variety, so in petroleum such isomers show some optical activity, being more left-handed than right. But usually there is some of both kinds. This has been interpreted as the result of racemization of the originally all left-handed isomers with time. If, then, it is said, the materials were originally all left-handed, it is reasonable to suppose that they came from living things, where such exclusive left-handedness is found.

Secondly, certain chemicals found in petroleum resemble those found in living systems. Porphyrins are a group of chemicals which are found in oil and which are believed to have been derived from chlorophyll. In other words, they are touted as chemical fossils. Hodgson and Baker stated,

> The presence of the chlorophyll-type structure in petroleum pigments suggests that a chlorophyll (e.g. chlorophyll "a") might be the initial pigment, and the abundance of this compound in nature strengthens the suggestion.[7]

Other chemicals with structure similar to those in living creatures and plants are those with structure similar to carotene, ring hydrocarbons similar to chloresteral. Petroleum even has a predominance of chemicals with an odd number of carbon atoms. Hydrocarbons formed by plants are also predominantly odd numbered.[8]

Organicists also point to the fact that tiny remnants of life are found in oil. Levorson citing Sander's 1937 investigation stated,

> He found a wide variety of micro-objects in crude oils from many pools. The long list of materials he found includes calcified or siliceous skeletal tests or frameworks, petrified wood fragments, foraminifera tests, minute pyrite globules or concretions, vegetable remains encrusted in silica, small crustaceans, insect scales, barbules, spore coats, algae, fungi cuticles, resins, and fragments of coal and lignite. Some of this material may well have been entrained in the petroleum from a foreign source as it moved through the rocks. The large variety of organic material, however, suggests a genetic relation between it and the petroleum in which it occurs.[9]

Another argument advanced by the organicists is based upon the observation that oil is not found in volcanic regions. If oil were the product of methane outgassing from the mantle, why then is petroleum not found in those regions? Also oil is not found in crystalline rocks other than in the weathered zone immediately below the sediments. The reason, according to the organicists, is obvious; oil is not the product of outgassing.

The final argument advanced by the organicists is that if oil formed inorganically deep in the earth and then migrated to the present sedimentary reservoirs instead of forming from the organic material found in shales, why then are sand reservoirs found that are full of oil, surrounded by shale with no major faults connecting the sand body with the deeper parts of the earth? Shale tends to stop oil from flowing through it so a sand body surrounded by a shale would be hard to fill with oil. The Morrow sand of Oklahoma has many reservoirs like this. If the oil is inorganic in origin then there appears no pathway for the oil to enter the sand. This proves, the organicists say, the organic origin of oil.

These are the best of the arguments in favor of organic origin. If one is to successfully argue for an

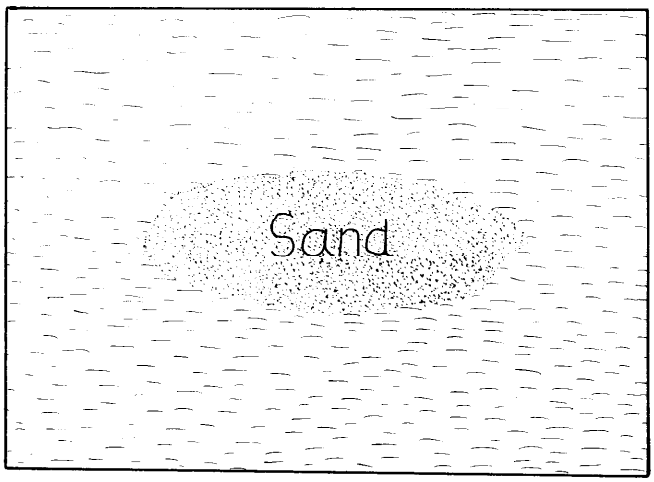

Figure 1. Isolated bodies of sand, surrounded by shale and containing oil, are found in such places as the Morrow formation in Oklahoma. It has been argued that the oil in the sand could not have come from anywhere but the shale, and that a biogenic origin of the oil is thereby implied. But see the discussion in the article.

inorganic origin for petroleum, one must successfully and convincingly counter these objections. We will take each of these arguments and examine them critically.

First, the fact that hydrocarbons in both oil and life are predominantly left-handed isomers is weakened greatly by the report that amino acids in the Murchison meteorite are overwhelmingly left-handed.[10] Optical rotation of polarized light traveling through organic matter from the Orgueil Meteorite has also been reported.[11]

The significance of finding predominantly left-handed organic molecules in meteorites is that the organic (in the chemical sense) matter presumably came from an (actually) non-organic source. If left-handed isomers can be produced by non-biologic means, then the force of the argument that left-handededness means life is dissipated.

The second argument that certain chemicals found in oil imply a biological origin for petroleum is weak for two reasons. First as Hunt noted,

> All hydrocarbons identified in life and petroleum still represent a minor fraction (probably less than 10 per cent) of crude oils—and most of this is in the higher boiling fractions—gas, oil and above. None of the light paraffin hydrocarbons in the ethane, nonane range have been identified in significant amounts in living things or in recent sediments, though they make up a major fraction of petroleum and are found in most ancient sediments.[12]

Secondly, porphyrins have been synthesized abiogenically and thus the existence of porphyrins may not imply that oil was generated biogenically.[13] Thus due to the fact that porphyrins constitute such a small percentage of crude oils, the fact that they can be formed abiogenically and the fact that the major chemicals of crude oil are not found in living systems or sediments today, it would appear that the inorganic hypothesis better fits the data. Then the biologic-simulating chemicals were either added to the oil during migration or formed abiogenically.

The tiny microfossils in oil reported by Sanders do not prove that they traveled from the source of the oil to the reservoir along with the oil. As Levorson noted, these objects could have become trapped in the oil during migration. Since both views of oil's origin agree that oil has migrated, this type of entrainment is not implausible.

The statement that hydrocarbons are not found in volcanic regions is just not true. It is true that no hydrocarbons are detected in the gases emitted by a volcano; but this is not unexpected. At the elevated temperature and oxidizing conditions at the surface of a volcanic vent, any hydrocarbons present would be quickly destroyed. However, several reports of exceptionally high methane levels are reported from structures associated with volcanos. Near Lake Kivu in Africa is the Nyiragongo lava lake. The bottom waters of Lake Kivu are saturated with methane. Gold and Soter noted,

> Perhaps the most striking example is that of Lake Kivu, which lies in the East African Rift valley; its deep waters contain some 2 Tcf (Trillion cubic feet) of dissolved methane, the largest methane anomaly for any lake in the world. It contains an even larger quantity of dissolved CO_2. Attempts to account for the CH_4 anomaly with a biogenic source have not been particularly convincing. The entire region consists of young volcanic rocks and the bottom sediments in Lake Kivu are not extraordinary. (The neighboring Lake Tanganyika, also occupying the rift, possesses much deeper sediments but has no such methane anomaly.)[14]

Gold and Soter also report that when Mid-Atlantic ridge basalts are pulverized small quantities of methane are liberated.[15] Welham and Craig[16] report large emissions of methane from the hydrothermal vents on the East Pacific Rise. The rise is a submarine ridge similar to the Mid-Atlantic ridge and is believed to be a spreading center where young oceanic crust is produced. There is little chance that the methane is biogenic. This methane is released at such a rate that all the methane in the oceans could be replenished in merely 33 years.

One final evidence of hydrocarbon generation in the earth's mantle comes from a surprising source—diamonds. Diamonds are found in their primary deposits only in geologic structures known as kimberlite pipes.[17] These pipes are believed to have come from more than 75 miles deep because it is at that depth that the thermodynamic conditions allow for the formation of diamonds rather than graphite. Giardini and Melton report,

> Diamonds formed within the earth's mantle, also have been found to contain occluded hydrocarbons, plus hydrocarbon-forming constituents such as H_2 and CO. Furthermore, Giardini, Salotti and Lakner (1968) and Giardini and Salotti (1969) have shown that petroleum can be formed by the non-biogenic reaction of H_2 with carbonates and carbonates are now known to be of upper mantle as well as crustal origin.[18]

The lack of oil in the crystalline basement is perfectly understandable. Oil in rocks occupies tiny pores in between the individual rock grains. In crystalline rocks such as granite there are very, very few pores so there is no place for the oil to be held. Only in the very uppermost granite is oil found; and this is because fractures or tiny cracks in the granite actually hold the oil. If there are no pores, there can be no oil; so this argument is specious.

The final argument against the inorganic view involves the oil-soaked sandstone completely surrounded by shale with no major faults to allow the oil to migrate into the sand. The problem with this objection is that there is no *sedimentary* rock which has no microfractures—including shale. Thus the oil could have used microscopic pathways into the isolated sand body.

Therefore I would conclude that the evidence for the organic origin of oil is weak at best. The inorganic origin of oil does resolve many difficulties presented by the organic theory to the young-earth creationist position.

One interesting side benefit of the inorganic view is that since the carbon contained in oil would have come from within the earth, there would be no carbon-14. Carbon-14 is made in the earth's atmosphere not in the earth's interior. This would easily explain why oil

contains no carbon-14 and still allow it to be young. If on the other hand oil were the result of the decay of biological organisms and were young, and the concentration of C-14 appreciable when the organisms grew, surely oil would then contain significant quantities of C-14.

Origin of Coal

The second part of the carbon problem concerns the fact that there is 50 times more carbon in coal than in the present biosphere. If one were to place a lush tropical jungle over all the earth then there is still 10 times too much coal. Even with the extreme assumption that a lush tropical forest covered the entire preflood world, oceans and land, there would still be twice as much carbon in coal as there would have been in that much plant matter. The known reserves of coal listed in the 1982 Encyclopaedia Britannica contain an estimated 6.75 times more carbon than the estimated lush preflood biosphere could reasonably have contained. How are we creationists to deal with facts like these and still retain a rational belief in a young earth? Considering the size of the problem, there appear to be only two possibilities which explain the situation—first, coal was enriched by methane outgassing and second, the geologic work of the Flood lasted longer than one year, as outlined in earlier papers.[19, 20]

The currently accepted uniformitarian view of the origin of coal holds that coals are the partially decayed and carbonized remains of plants that lived, died and were buried in the same general locality. Primarily, it is believed that the plants were swamp plants which did not decay completely when they died. A layer of peat is believed to have collected over a long period of time, gradually building in thickness. Eventually, the land in the area of the swamp subsided and was covered by the ocean and the peat layer was subsequently buried by other strata. After its burial the peat was compressed and with increasing temperature and pressure, the peat was gradually transformed into coal.

Within the uniformitarian system of thought, this theory fits well. It is supported by the fact that swamp-like plants and animals are found in the Carboniferous coal deposits, the major coal deposits in the world. The present view is also supported by trees found standing upright. (Although it may be questioned whether they could have been buried that quickly.) Francis states

> One phenomenon frequently advanced as proof of autochthonous coal formation is the presence of tree trunks standing upright in coal seams, with attached roots standing in the soil forming floor of the seam—i.e. the stigmaria of Lycopods.[21]

Certain facts, however, tell against this neat view of coal's origin. The first problem concerns the huge masses of plant matter necessary to form the observed coal seams. F. H. Knowlton reported,

> As already indicated, the Corwin formation reaches the enormous thickness of over 15,000 feet and contains forty to fifty coal beds which range from 1 or 2 to over 30 feet, ten being over 4 feet thick and suitable for mining, the whole aggregating at least 150 feet.[22]

Schuchert and Dunbar report that one bed in this region is over thirty feet thick.[23] In the Homer district of the Kenai Coal field in Alaska there are 30 coal seams ranging from three to seven feet in thickness.[24]

None of this sounds impressive until it is realized that it has been estimated that it takes 10 feet of plant matter to form one foot of peat and 12 feet of peat to form one foot of coal.[25] It would require 3600 feet of plant matter or 360 feet of peat to form the thirty foot coal bed reported by Schuchert and Dunbar. Thus for plant matter to form the aggregate total of 150 feet of coal reported by Knowlton, 18,000 feet of plant matter must have been deposited in that one area, according to the previous assumption. I would submit that that thick of a layer of plant matter would seem hard to account for even in a world-wide Flood.

As for the uniformitarian theory of coal's origin, W. G. Woolnough stated,

> Again, nowhere in the world, at present, can accumulations of vegetable matter be found which are *quantitatively* commensurate with any of the major coal deposits of past geological time.[26]

The reason that we currently don't find such huge masses of peat is that the peat decays nearly as fast as it is produced.[27]

The second problem with the current view is that occasionally marine fossil shells are found in the coal.[28, 29] The existence of these marine fossils is utterly inconsistent with the view that coal represents the deposits of a fresh water swamp. Marine creatures could neither tolerate the fresh water nor the swamp trees the salt water.

The third problem with the uniformitarian theory of coal formation concerns the sediments interspersed with the coal itself. Quite often beds containing deep sea crinoids and clear water coral alternate with coal seams.[30] Stutzer in arguing for a marine algal origin for coal noted,

> Likewise, we know of coal beds which are overlain by marine strata. These must have originated at the bottom of an ocean. Why, then, may not some coals also have been deposited on the ocean bottom.[31]

Erratic boulders are often found in coal, far from any lithologically similar stone. Stevenson reports,

> Fragments of rock are the foreign bodies which are the most perplexing . . . Roemer soon afterward described 3 small fragments from a coal bed in Upper Silesia; they were of crystalline rock, unlike anything known in Silesia. E. B. Andrews in 1870 announced the discovery of a waterworn quartzite fragment in the coal at Zaleski, Ohio, half embedded in the coal. Newberry in 1874 saw a fragment of talcose slate in the parting of coal No. 1 at Mineral Ridge, Ohio, which he thought might have come from the Canadian Highlands; somewhat later he found a rounded quartzite fragment in the Block coal, resembling a Huronian rock in Canada.[32]

Sedimentary erratics resembling local carboniferous rocks, are found in Belgium.[33]

Within the uniformitarian explanation of coal's origin, these erratics are believed to have been carried into the coal seam by trees which had rocks entangled in their roots. The trees were supposedly uprooted

from stream banks and washed into place. There are enormous problems with this view as noted by Stevenson,

> The weight of some fragments, upwards of 100 kilogrammes, is too great to admit of transportation by Stigmaria, while the presence of blocks of mud would suggest that hollow trees had shared the work. In any event, there would always remain the remarkable purity of coal, so difficult to explain in view of the great amount of inorganic material known to be transported by floating trees.[34]

Thus the actualist explanation of the erratics fails. Indeed, the creationist explanation of extremely rapid deposition during a one-year Flood may encounter difficulties in explaining the presence of sedimentary erratics which presumably required some time to form prior to its subsequent transportation and burial in the coal.

The next problem confronting the swamp theory is one that has been quite regularly pointed out by the creationists. That is that non-swamp plants are often found in association with coals. Pine, spruce, hemlock, sequoia and other dry land conifers are found in European and North American lignites.[35] Palms, birch, beech, magnolia, cinnamon and others are reported from Cretaceous coals.[36] This would seem difficult to explain on the basis that coal formed in swamps.

Modern deposits of peat generally do not lie conformably on top of the underlying rocks. (Figure 2.) Francis, citing Fox's work, notes,

> In no known instance in India have coal seams been found unconformably overlying older strata and never directly on granitic or gneissic rocks. In contrast, the general mode of accumulation of peat is one of unconformity on the rocks below.[37]

Thus we must conclude from all of the above that the classical actualist or uniformitarianist view of coal's origin cannot be correct. On the other hand, is it really necessary to hold that only one biosphere produced all the coal? Are there other alternatives?

This author feels that there are at least two alternatives within the creationist framework to account for the massive amount of carbon. The first possibility, a radical view of the origin of coal, assumes that much of the carbon in coal is not organic. According to this view, organic plant material was deposited, by whatever means, and this organic layer contained much, much less material than required by classical coal origin theories; but it acted as the center for further carbon deposition. After the burial of the organic material, methane outgassing enriched the carbon in the organic layer. Gold and Soter suggest,

> Although the origin of coal is widely believed to be completely understood, we think that it, too, has frequently (but not always) a relationship to ascending methane. In circumstances where free hydrogen is allowed to escape rapidly, and where temperature, microbial and catalytic actions favor the dissociation of methane, carbon will be shed from the gaseous stream. This may account for the fact that many fossils in coal are found to be highly enriched in carbon relative to the original plant matter; some fossils are so infused that the interior of every cell is filled with carbon. Occasionally a well-preserved fossil can be found embedded in an otherwise homogeneous matrix of coal. In such cases, it seems unlikely that it was other plants of the same kind and period, suffering the same treatment, that resulted in the homogeneous coal seam.[38]

Undoubtedly many readers are having the same reaction to this idea that this author had when he first heard of it. There are, however, several pieces of data that seem to fit well with this idea. First, contrary to most people's conception of coal, coal is not normally recognizable as plant matter. The Encyclopaedia Britannica states,

> For the most part, no macroscopically recognizable plant remains are found in coal; on the other hand, well preserved remains and indications of plant life are found in the underlying and sometimes the overlying deposits.[39]

Occasional fossils are found in the coal, as has been noted above, but primarily coal is a relatively homogeneous carbon-enriched material. The finding of fossil plants in strata above and below coal may or may not be indicative of coal's origin. After all fossil plants are quite often not in association with coal.

Gold and Soter cite regional correlations between coal and oil where large coal and oil deposits are found in the same region. Such areas include, the Appalachians, Alaska, Colombia, Wyoming, Iran, and Venezuela. There are also vertical correlations of oil, gas and coal. They report,

> In addition to regional correlations, there are also vertical correlations; the same region may show particularly rich deposits of coal, oil and gas, all vertically stacked, but spanning very long periods of geologic time. In Indonesia there are regular sequences of oil and coal vertically stacked above one another. The San Juan Basin of New Mexico is a particularly good example; gas and oil in large amounts are found in deep Mississippian sediments more than 300 million years old, above which are multiple coal seams of Cretaceous age (about 100 million years old). The biogenic theory

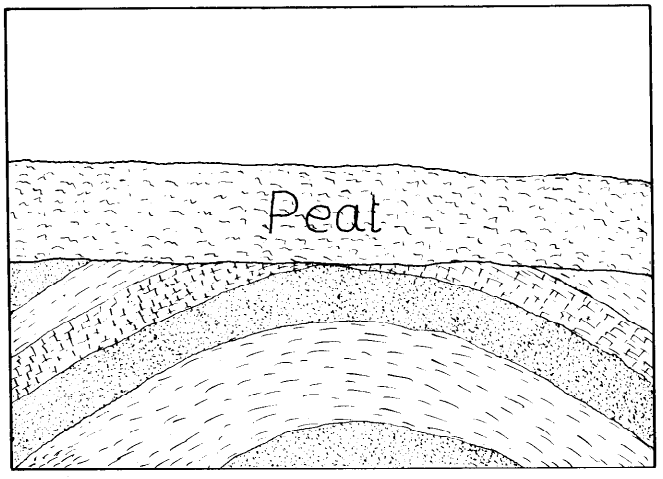

Figure 2. Peat normally lies unconformably over the lower beds.

is hard pressed to explain why the same small spot should have been repeatedly favored for production of rich organic sediments at totally different epochs, when local topography, climate, and all other surface conditions had changed completely. However, one can understand on the basis of long-lived deep methane seeps that the augmentation process would have been at work at all levels, and with different results depending on the detailed local conditions.[40]

Precambrian Coal

The best evidence, however, that methane outgassing played a role in the origin of coal is the existence of Precambrian coal. Within the uniformitarian system of thought, the Precambrian was a time during which there were no plants with which to form coal and yet, the coal is there. Mancuso and Seavoy relate,

> Anthraxolite is a name suggested by E. J. Chapman for a black, combustible coallike solid found in Precambrian rocks that resembles anthracite coal but occurs in veins and fissures. It was regarded as having been formed by the low-grade metamorphism of liquid bitumen that was probably derived from algal remains. Deposits of coal or anthraxolite could well have been the source for high-grade graphite deposits. Occurrences of coal and anthraxolite have been reported and described from a number of localities in the Precambrian rocks of Michigan, Ontario, the Northwest Territories and northern Minnesota.[41]

Several interesting items stand out about these Precambrian coals. First they occur in veins and fissures cross-cutting the Precambrian sediments. Coal, as noted above and by Mancuso and Seavoy,[42] is usually conformable with the beds above and below it. (Figure 2.) Anthraxolite and the presumed metamorphic remains of anthraxolite, Precambrian graphite, cuts across bedding planes. Secondly, the anthraxolite must have been introduced into the Precambrian sediments *after* the sediments were deposited but either before or during the metamorphism of the sediments. Since metamorphism is a product of proximity to a heat source and since igneous activity is an excellent heat source, one must wonder if the anthraxolite was associated with the igneous and metamorphic event. In that case, anthraxolite formation would be associated with activity deeper in the earth. The third outstanding feature of anthraxolite is its widespread occurrence. Anthraxolite veins 2-3 meters thick occur in the Sudbury basin in Ontario,[43] in the Gunflint chert of Ontario,[44] in the Crimea and Siberia,[45] Sweden and South Africa.[46] Fourthly, even some opponents of the abiogenic origin for hydrocarbons have yielded on the question of the origin of anthraxolite (uraniferous hydrocarbons). Professor G. Mueller conceded,

> The case for the abiogenic origin of the uraniferous hydrocarbons seems to be very strong indeed; their high oxygen/hydrogen ratios are in sharp contrast with the much lower values of all known biogenic substances, and most of the localities are situated within large intrusions of granite, far removed from probable or conceivable organic sediments.[47]

More recent geochemical studies have supported the view that at least part of the carbon in anthraxolite is of Precambrian origin. Hayatsu, *et al.*, report,

> Although there is no direct proof that the polycondensed aromatic-rich material in the sample was deposited at the time of the Gunflint sedimentation, it is very likely. This means that the major portion of aromatic-rich material is of Precambrian origin.[48]

One interesting occurrence of a similar substance is the Albert coal of New Brunswick, which was mined in the last century. The coal vein is contained within sedimentary rocks of Carboniferous age. Hitchcock reported that this coal occurs in "true cross-cutting veins, not in sedimentary beds like ordinary coal."[49] He also concluded that the Albert coal must be compared with the asphaltic and bituminous veins found in the Quebec group in Canada. Older crystalline rocks are found only two to three miles southwest of the Albert coal. Once again there is a correlation between igneous and metamorphic rocks and vein coal implying the possibility of a genetic connection. The possibility of at least a partially inorganic origin of coal should not be rejected out of hand.

The second possibility for explaining the huge quantity of carbon is that more than one biosphere was buried during (or after) the Flood. This author has suggested that the period during which the geological work of the Flood was accomplished was longer than one year. In fact, several centuries was the suggested duration. In this fashion several biospheres of plant material could have been buried and formed coal over a period of time. Whatever method one uses to account for the huge quantities of carbon in coal, the model of origins postulated should be able to accommodate the fact.

Limestone

In today's oceans, limestone is deposited by both chemical precipitation and organic deposition in the form of shells, corals, etc. Unfortunately this author has been unable to find any estimate of the percentage of organic limestone; and without that information the third part of the carbon problem will remain at least partially unresolved. It must, however, be admitted that the number of biospheres which would be needed to account for the organic portion is quite large. For instance, the estimated 10,000 cubic miles of broken crinoid plates, if spread evenly over the earth's surface would form a layer over three inches deep. This is the organic material from just one limestone bed from northwestern North America. Other beds conceivably could add as much. The upper Ordovician limestones of the mid-continent are up to 80 or 90 percent shell material.[51] The Austin chalk upon which Dallas is built is little more than several hundred feet of dead microscopic animals. The Monterey Formation in California is composed primarily of dead diatoms—thousands of feet of them.

However, even apart from the organic problem is the quantity of CO_2 necessary to have deposited the observed amount of limestone. Gold and Soter report,

> Estimates have been given for the total amount of CO_2 that would have been required to produce all

the sedimentary carbonates, ranging from about 15 to 80 Kg/cm^2 over the surface of the Earth. We adopt a value of 50 Kg/cm^2, equivalent to some 50 atmospheres. There was probably never a very large amount of CO_2 in the atmosphere at any one time, but rather it seems to have been put away into limestone more or less as fast as it was supplied. In contrast, Venus, the sister planet of the Earth (with comparable size and density), has outgassed about 95 atmospheres of CO_2, all of which remains in its atmosphere to this day, as there is no ocean to precipitate it.[52]

These problems with limestone are real. One explanation which would fit the facts and retain a young earth is that the geologic work of the Flood lasted over some period of time considerably longer than one year. Noah, indeed, was only on the ark for approximately one year; but Noah, his immediate descendants and the animals could have lived in some secluded highland location while the effects and work of the Flood raged on at lower altitudes.

Conclusion

Whatever explanation for the carbon problem is finally accepted it is hoped that these thoughts will point the way to the final resolution; and it is urged that creationists who are familiar with these matters undertake some investigation of the various possibilities.

Appendix

If one were to kill all the plant material in one hectare in a moist tropical forest and then weigh the *dried* plant remains, he would find that there are on average 525,000 kg per hectare.[53] Assuming that the forest extended all over the present land area of the earth the dried biomass would be 525,000 kg/ha $\times$ .001 ha/m^2 $\times$ 1.49 $\times$ 10^{14} m^2 of land on earth = 8.05 $\times$ 10^{15} kg of plant material. Since living systems are about 18% carbon[54] then there would be 1.45 $\times$ 10^{15} kg or 1.45 $\times$ 10^{18} grams of carbon. Since we have assumed that the world-wide tropical forest represents the preflood biosphere we can now use this value to find how many biospheres it would take to produce the coal, oil and gas that we observe.

Using Hunt's estimate of 201 $\times$ 10^{18} grams of carbon in petroleum means that there is 201/1.45 = 138 times more carbon in petroleum than would have been in the preflood biosphere.

Using Hunt's estimate of 15 $\times$ 10^{18} grams of carbon in coal means that there is 15/1.45 = 10.3 times more carbon in coal than would have been in the preflood biosphere. The Encyclopaedia Britannica in its 1982 edition listed proven coal reserves as 11.6 $\times$ 10^{12} metric tons, which is 1.16 $\times$ 10^{19} grams of coal. Using a value of 84% carbon which is reasonable for bituminous coal implies 9.8 $\times$ 10^{18} grams of carbon. Thus there is 9.8/1.45 = 6.75 times more carbon in the proven coal reserves than could have been in the assumed preflood biosphere.

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THE ARCHAEOLOGY OF WORDS AND THE ALPHABET

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Just as long-buried artifacts can provide clues about the history of their former owners, so languages, and the symbols with which they are written, can help to throw light onto ancient matters. It is noted that there is no trace of an evolutionary origin for the alphabet, any more than there is for language. As is well known, many ancient peoples used their alphabet also as a system of numerals. Moreover, there seem to be connections between the alphabet and the calendar, which suggests that the forms and arrangement of the letters owe something to astronomy.

Introduction

There is abundant evidence that before widespread travel across the seas was undertaken by the Phoenicians, Greeks, Carthaginians, Egyptians, and Romans, certain key names and words had already been taken by land and water throughout the world, perhaps even to lands now buried under miles of ice, as, for example, the Antarctic continent.

Although these names and words have undergone change over the centuries, they can still be found in their changed forms when competent scholars study the native place names of rivers and mountains, of volcanoes, waterfalls, lakes, islands, regions, towns and cities.

Moreover these same names and words are found in personal and tribal names, in mythological and deified names, and in the names for animals, birds, fish, flowers, trees, foods, and parts of the body. Only half-concealed in the spoken and written languages of widely separated peoples in the world are intriguing clues to man's ancient past. These key words, blended into many combinations in many languages can be identified in two distinct groups. Words of the first group are found in all parts of the world. Key words of the second group are found in the Mediterranean area, Europe, Africa, parts of Asia, West Indies, Brazil, the Gulf Coast of Central America, the east coast of North America, Japan, the Philippines, Australia and New Zealand. Thus two old dispersions of people have been identified and recorded. Further it is startling that legends about the garden of Eden, the expulsion of Adam and Eve, the temptation by the serpent, the sharing of forbidden fruit, the confusion of tongues at the Tower of Babel, and the story of the great Flood were found in Middle America by the Spanish before priests began their work with the Indians. Clearly such claims by students of language must be examined.[1]

If we live in the kind of young world described in Genesis, if the world was destroyed in a universal Flood, if Noah's three sons and their wives began to repopulate the entire world, if the confusion of tongues really happened as described, if the Table of Nations is a true genealogy of nations and the accurate description of language families, there ought to be some hints of the great events half-buried in the languages which have come down to us. It is not necessary that there be such evidences, but just as ancient artifacts have been preserved over millennia down to the present, we need not be surprised to find equally ancient and impressive linguistic "artifacts" if we look closely at language.

What might we look for? The root meaning of some modern words could well go back to interesting facets of the daily life of our remote ancestors. If in very ancient times man was the kind of world traveler/navigator described above, there ought to be some linguistic relics lying around to support such a view of the past. If we live on a young earth, there ought to be some evidences in languages of interactions among peoples before the great separation occurred at Babel. If earliest man was as sophisticated as modern man, there is no reason to accept the notion that the alphabet was a relatively recent discovery made many thousands of years after cruder forms of speech had been

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